

Sofia Quaglioni



Sofia Quaglioni can't help but think about the mentors who have gotten her where she is today.

As the recipient of a Department of Energy Office of Science 2011 Early Career Research Program award, Quaglioni, 33, wouldn't have been able to come to a new country from her native Italy, and dive into research in developing a comprehensive framework of the structural properties and reactions of light nuclei, if not for the people "who never stopped believing in me."

Quaglioni received her Ph.D. from the University of Trento, Italy, and spent one year as a postdoc at the University of Arizona prior to coming to LLNL as a postdoc in 2006. Her work has helped lead to the emergence of a new capability to describe light-ion reactions important to stellar astrophysics and fusion energy programs from first principles, which will now permit a wide range of fundamental studies in nuclear physics.

With her \$2.5 million award over five years, Quaglioni plans to develop a comprehensive framework that will lead to one of the long-sought goals of nuclear theory – a fundamental description of both structural properties and reactions of light nuclei, which includes proton and neutron interaction.

"This is now within reach, as new promising techniques and the required computational power to implement them are becoming available," she said.

To achieve this goal, Quaglioni plans to build upon a first-principles approach for light nuclei that has been developed here at LLNL, thanks to a Laboratory Directed Research and Development grant that is now in its third and final year.

This project will provide the research community with the theoretical and computational tools that will enable:

- An accurate prediction for the fusion reactions that power stars and Earth-based fusion facilities;
- An improved description of the spectroscopy of exotic nuclei, including light borromean systems; and
- A fundamental understanding of the three-nucleon force in nuclear reactions and nuclei at the drip line.

“This is a huge honor and privilege,” Quaglioni said. “I feel overwhelmed with excitement. Quite honestly, it will take me a few more days to fully realize what just happened. I feel extremely grateful to all the people that have mentored me in these past years and have helped me become who I am as a physicist, and to the Department of Energy for giving me such an extraordinary opportunity to start and consolidate my scientific career.”

Quaglioni said she would have never received such an award if not for her former advisers G. Orlandini, who instilled in her the passion for nuclear physics, Bruce R. Barrett, who brought her to the United States from Italy, and LLNL’s Petr Navratil with whom she started developing this new technique.

She also credited former group leader Erich Ormand and section leader Dennis McNabb “who never stopped believing in me. “